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Signature

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application Of: Palazzo et al.

For: Use Of Heat-Treated Electrodes Containing A  
Polyamic Acid-PVDF Binder Mixture

the specification of which is being transmitted herewith.

Assistant Commissioner of Patents  
Washington, D.C. 20231

**INFORMATION DISCLOSURE STATEMENT  
Pursuant to 37 CFR 1.56**

1. Applicants submit herewith patents, publications or other information of which they are aware, which they believe may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR 1.56.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 CFR 1.56(g)), an admission that the information cited is, or is considered to be material to patentability or that no other material information exists.

IDS For: Use Of Heat-Treated Electrodes Containing  
A Polyamic Acid-PVDF Binder Mixture  
Inventor: Palazzo et al.

The filing of this IDS shall not be construed as an admission against interest in any manner (Notice of Jan. 9, 1992, 1135 O.G. 13-25, at 25).

2. Attached is Form PTO-1449. Legible copies of all items listed accompany this IDS.

3. A concise explanation of the possible relevance of the listed information items is as follows:

Patents:

U.S. Patent No. 6,001,507 to Ono et al. relates to non-aqueous electrolyte batteries comprising lithium-based electrodes. The negative electrode may comprise an active material made of a chalcogen compound such as  $V_2O_5$  and  $V_6O_{13}$  into which lithium ions can be inserted and from which the lithium ions can be desorbed. Either the cathode or the anode may comprise a binder which is a mixture of a fluorine polymer such as PVDF and an imide. The specific polyimide is shown in column 3, Chemical Formula 2, and is a material "which has been converted into imide at least before it is mixed with the depolarizing mix as the binder...". Column 3, line 65 to column 4, line 4. Electrodes according to Ono et al. are described as prepared from a mixture of a soluble polyimide and PVDF combined

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with an electrode active material such as  $\text{LiCoO}_2$ . Then, the depolarizing mix is dispersed in N-methyl-2-pyrrolidone (NMP) to form a slurry which is applied to an aluminum foil, dried, and compressed by a roll press.

U.S. Patent 6,068,950 to Gan et al., teaches an organic phosphate additive for non-aqueous electrolyte in electrochemical cells having cathodes fabricated from metal oxides including SVO. The cathode is manufactured from the cathode active material and preferably a powdered fluoropolymer binder present at about 3 weight percent (column 5, lines 30-32).

U.S. Patent Nos. 5,004,777 and 5,264,483, both to Hallden-Abberton et al., relate to blends of thermoplastic polymers and imide polymers. As shown at examples 126-134 and 135-143 in each patent, the blends may comprise polyvinylidene fluoride (PVDF) and an imide polymer. The resulting blends may incorporate fillers, conductive materials and the like

U.S. Patent No. 5,959,022 to Lin et al. discloses a blend of PVDF and a compatible organic polymer containing one or more imide groups. Lin et al. indicate that melt extrusions of PVDF with an imide-containing polymer generate compatible blends for paints having increased strength and wear resistance.

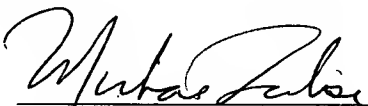
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4. The remaining patents listed on Form PTO-1449 were culled from the inventors or the attorney's files.

5. The person making this statement is the agent who signs below, who makes this statement on the information supplied by the inventors and the information in the agent's file.

Respectfully Submitted,

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